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Are Spanish companies involved in profit shifting? Consequences in terms of tax revenues

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Abstract

In this paper the authors analyze the existence of profit shifting between Spain and other OECD and EU countries. Using a sample of 1,169 Spanish subsidiaries owned by foreign OECD and EU parent companies and a sample of 317 EU subsidiaries owned by Spanish parent companies, taken from the AMADEUS Database for the period 2005 to 2014, and a simple tax rate difference as a measure of the tax incentive, the authors obtain a negative effect of corporate income taxes on reported profits. When the tax rate differences between Spain and the foreign countries vary by one percentage point, reported profits vary by approximately 2.7 to 3%. This is consistent with profit shifting activity by corporations and matches the empirical results in the literature. Furthermore, the authors calculate the impact of this activity on Spain's tax revenues from the sample of Spanish subsidiary companies. They obtain that the tax revenues vary from year to year, depending on the level of taxation of the main investor countries in Spain in comparison to the Spanish tax rate.

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1 Introduction

Among multinational enterprises (MNEs), profit shifting (PS) is a tax planning strategy within a group consisting of artificially shifting taxable income from entities located in high tax paying countries (basically, countries with high corporate income tax, CIT) to entities located in countries with lower tax rates.

The PS phenomenon, like other tax avoidance and evasion devices, causes what is known as Double Non-Taxation, which refers to the minimisation and sometimes zero taxation of certain taxable income (or more generally, taxable object). Where there is PS activity, worldwide CIT revenues become lower because profits are taxed at low tax rates.

Nowadays these tax minimizing activities are encouraged by the discrepancy between the features of today's economy and the international taxation standards (based on the Separate Accounting Method) created a century ago, when international exchanges of goods and services were limited and business models were simpler. While the world economy is becoming ever more globalized, current international taxation standards require MNEs to report profits separately in the different jurisdictions in which they operate. This creates an opportunity for MNEs to develop strategies to reduce their tax burden, most of which are legally acceptable, because it is difficult to determine where profits are created.[1] The digitalization of the economy, the complexity of business models and the diversity of tax rules in different jurisdictions (which creates tax loopholes) also make it easier for companies to develop these strategies.

Two of the most popular PS mechanisms among MNEs are transfer pricing and thin capitalisation. Transfer prices are the prices that entities set when they exchange services and/or goods within the multinational group, i.e. the prices applicable to related-party transactions, which have to be determined as if the transactions were between independent enterprises, i.e., according to the arm's length principle. And the term "thin capitalisation" refers to a situation in which a company is disproportionally financed by debt, i.e. it has a disproportionate debt to equity ratio according to the arm's length principle.

Both transfer pricing and thin capitalisation consist of declaring more revenues (and thus, higher profits) in the jurisdictions where tax rates are most favourable,

[1] In this context, the traditional international taxation problem of double taxation may also arise.

and more deductible expenses (and thus, lower profits) in the ones where they are least favourable. The Transfer Pricing strategy achieves this result by manipulating the transfer prices according to taxes in situations in which it is difficult to assess the correct application of the arm's length principle. This is usually the case when transactions include specific intangible assets without counterparts in the market. And in thin capitalisation, group companies in low tax jurisdictions, where interest has to be reported and taxed, lend money to their sister companies in high tax jurisdictions, where interest is deducted.[2]

Therefore, both strategies take advantage of the difficulty of valuing international transactions within groups in market conditions (one manipulates transfer prices and the other, amounts of debt) and the different tax rules (mainly, tax rates) in different jurisdictions.

Apart from Double Non-Taxation and loss of tax revenues, PS causes an equity problem between territories because the international movement of profits is not accompanied by a parallel movement of the real economic activity that generates such profits. As a result, companies create value in some jurisdictions, taking advantage of the high investment yield they provide, and report profits in other ones with low tax rates. This results in a transfer of economic resources from the territories with high CIT rates, where economic activity is carried out, to the ones with low CIT rates.

In spite of these negative consequences of PS, according to Hines (2014:444-446), its impact is limited. There is evidence that MNEs do not accomplish PS entirely. First, high tax countries still collect tax revenues from the CIT. Second, the real activity of corporations is still affected by taxes (there is a consensus on the subject in the empirical literature); and third, not all MNEs have affiliates situated in countries with the most favourable tax treatment, the tax havens.

The reason for the containment of PS activity is the cost of such activity for MNEs. According to Hines (2014:450), PS produces administrative and compliance costs and more importantly, costs deriving from the need to change real activity to enable income reallocation. Although PS disassociates reported profits from value creation, a certain level of real economic activity in the territories where profits are reported is necessary to justify such reported profits.

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[2] Dividends (which constitute equity remuneration), as opposed to interest, cannot be deducted (Fatica et al., 2012).

Recently, some leading international institutions and governments have expressed concern about PS and the reduced taxes paid by some MNEs. Since the financial crisis and the loss of economic resources, the taxation scandals of MNEs have become front page news. One of the most important international initiatives tackling the situation is the OECD's base erosion and profit shifting (BEPS) project, launched in 2013, with the final reports published in September 2015 (OECD, 2015). This consists of a package of measures aimed at aligning taxation and value creation by driving needed changes and improvements in current international taxation standards. In addition to the OECD, the EU has been working on international taxation problems from the beginning, and is now developing an Action Plan on Corporate Taxation (European Commission, 2015). Among other measures, the EU has relaunched the Common Consolidated Corporate Tax Base (CCCTB) proposal (European Commission, 2016a and 2016b).

In this context, our paper sets out to test empirically the existence of artificially shifted profits related to Spain and to determine and assess the positive or negative consequences for the country in terms of tax revenue collection, i.e. if profits are shifted from or to Spain. Specifically, PS in or out of Spain is analysed from a sample of Spanish subsidiaries owned by OECD and EU parent companies, and from a sample of EU subsidiaries owned by Spanish parent companies.

The remainder of the paper is divided into six sections. Section 2 reviews the empirical literature. Section 3 explains the empirical methodology and data. Section 4 carries out a descriptive analysis of the sample. Section 5 presents the results. Section 6 accomplishes a series of additional analyses and robustness checks. And section 7 presents our conclusions.

2 Review of the empirical literature on profit shifting

There is a consensus on the existence of PS activity in the empirical literature. However, such a consensus does not exist with regard to the magnitude of the activity and the main methods used to accomplish it.

2.1 Proving the existence of profit shifting activity

Two kinds of empirical approaches are used to identify the existence of PS activity: direct and indirect. The direct approach consists of identifying particular PS strategies. Examples of this kind of empirical approach can be seen in Clausing (2003), with regard to the transfer pricing strategy, and in Blouin et al. (2011), Blouin et al. (2014) or Buettner et al. (2012), regarding the thin-capitalisation strategy.

The indirect approach is based on the expected results of the PS activity. The traditional model comes from Grubert and Mutti (1991) and Hines and Rice (1994), and rests on the assumption that corporations declare more profits in territories with relatively low CIT. It then postulates a negative relationship between profits and taxes. Although this result is found if PS activity exists, the same is true when companies, instead of moving their taxable income due to taxes, move their investments, which generate true profits. The reaction of investments to taxes has been widely proven by the empirical literature.

Based on the above, the basic premise of the Hines and Rice approach is that MNEs' reported profits are equal to the sum of true profits derived from real economic activity and profits artificially shifted (positive or negative). Therefore, when analysing the relationship between reported profits and taxes to prove PS, it is necessary to control for those explanatory variables with an impact on true profits of enterprises. They have usually been proxies of the inputs capital and labour and their productivity.

Since Hines and Rice (1994), a great deal of empirical work has used the same approach. We can for example point to Huizinga and Laeven (2008) or Lohse and Riedel (2013). A summary can be seen in Appendix 1. Furthermore, there are other more recent economic and accounting indirect approaches to prove the existence of PS behaviour – for example, in the papers of Collins, Kemsley and Lang (1998); Klassen and Laplante (2012); Dyreng and Markle (2016); or Dharmapala and Riedel (2013). A review of the indirect evidence method in general can be found in Heckemeyer and Overesch (2013) and Dharmapala (2014), but the Hines and Rice approach has been the most used to date.

2.2 Evaluating the magnitude of profit shifting and identifying the main strategies used to accomplish it

As remarked above, there is no consensus on the magnitude of the PS phenomenon and therefore, on the consequences in terms of tax revenue collection. However, as Hines (2014:444) points out, the economic consequences of the PS behaviour motivated by CIT cannot be very significant given that CIT amounts to a very small part of the total tax revenues of major economies (the same is not true for less developed countries). In any case, what is clear and really significant is the fact that there is a distributive justice problem between territories.

Heckemeyer and Overesch (2013) performed a meta-analysis considering all possible variables that could have affected the magnitude of the various results of 25 studies based on indirect approaches, and derived a semi-elasticity of pre-tax profits to the international tax differential of 0.8, in absolute terms. This means that "reported profits decrease by about 0.8% if the international tax differential that can be exploited for tax arbitrage increases by 1 percentage point" (Heckemeyer and Overesch, 2013:2). They also obtained that non-financial strategies (Transfer Pricing and licensing) dominate over financial ones (thin capitalisation).

On the other hand, Heckemeyer and Overesch (2013:10–16) detected a series of methodological choices that could have affected the range of quantitative results. These choices refer to the proxies of the model variables (the measure of the companies' profits used as a dependent variable, the tax incentive proxy, and the labour and capital indicators), the level of disaggregation of the data and the econometrics.

With regard to the proxies used for the dependent variable it is possible to distinguish four kinds of measures: pre-tax profits, post-tax profits, pre-tax earnings and post-tax earnings. According to these authors, using earnings instead of profits is expected to lead to a lower magnitude of PS behaviour because of the exclusion of interest and thus, of the financial strategies (thin capitalisation) for PS. Also, the impact of CITs on profits is expected to be higher when the measure of the dependent variable includes taxes.

The treatment given to the measure of the CIT incentive for PS is another major methodological issue. Some papers have used as a proxy for this measure only the tax rate of the country where profits are reported, while others (first

Huizinga and Laeven, 2008 and later De Simone, 2016 and Markle, 2016) have calculated weighted average tax rate differences considering all tax rates and profit-shifting opportunities throughout the territories where the MNE operates.

Lastly, we would like to emphasize the introduction of industry fixed effects in the econometric specification as a way to control for the use of intangible assets. Some economic sectors have a high level of intangible assets (such as pharmaceuticals), which according to Dischinger and Riedel (2011:693), could have important effects on both true profits and shifted profits. Intangible assets usually produce a relatively high level of profits, and at the same time, make the Transfer Pricing strategy of MNEs easier. The prices of these assets are difficult to set according to the arm's length principle because of the lack of similar transactions on the market (Grubert, 2003:226). Thus, companies in sectors with a high level of intangible assets have more opportunities to use the Transfer Pricing strategy to shift profits.

3 Empirical methodology and data

3.1 Empirical methodology

We use the Hines and Rice indirect approach to verify the existence of PS activity by companies located in Spain. In addition to the basic premise of this approach (reported profits are equal to true profits plus shifted profits) Hines and Rice (1994:16) assumed that PS activity is costly. As we explained in the introduction, there is evidence that it is not fully performed due to such costs. In particular, Hines and Rice (1994) presumed that marginal costs from PS activity increase as the ratio of reported profits to true profits increases.

This equation shows the main idea of the Hines and Rice approach:

$$\pi_i = \rho_i + \phi_i - \frac{a}{2}\frac{(\Phi_i)^2}{\rho_i}; \qquad (1)$$

where π_i are reported profits in country *i*, ρ_i are true profits in country *i*, ϕ_i are profits shifted into or out of country *i*, and $\frac{a}{2}\frac{(\Phi_i)^2}{\rho_i}$ are total PS costs in any of the two-way directions, being the parameter $a>0$.

From this initial equation, the authors derived the expressions for shifted and true profits. On the one hand, they calculated optimal shifted profits by a MNE by maximising global profits net of taxes (t_i) and PS costs, taking as fixed true profits.

$$Max \sum_{i=1}^{n} (1 - t_i) \left(\rho_i + \phi_i - \frac{a}{2} \frac{(\Phi_i)^2}{\rho_i} \right) \tag{2}$$

$$subject\ to \sum_{i=1}^{n} \phi_i \leq 0$$

And on the other hand, they estimated true profits (which are not observable) from a Cobb-Douglas production function $Q = cA^{\varepsilon}L^{\alpha}K^{\phi}e^{u}$. Where A is the level of productivity in the local country, L is the labour input, K is the capital input, c is a constant term, ε, α and ϕ are the output elasticities of the respective inputs and the productivity, and e^{u} is a random term. Assuming that true profits are equal to the production function less the labour costs, which are the wage (w) times L, and assuming w is equal to the marginal product of labour, they derived the following expression:

$$Q - wL = (1 - \alpha)cA^{\varepsilon}L^{\alpha}K^{\phi}e^{u} \tag{3}$$

Making some substitutions and calculations to define a particular measure of the tax incentive variable, the authors obtained an expression in logarithms like the following one for analysing the existence of the PS activity:

$$Ln(\pi_i) = \beta_1 + \beta_2 lnA_i + \beta_3 lnL_i + \beta_4 lnK_i - \gamma(Tax\ incentive_i) + u_i; \tag{4}$$

where $\beta_1 + \beta_2 lnA_i + \beta_3 lnL_i + \beta_4 lnK_i$ accounts for reported profits derived from real activity of MNEs, and γ *(Tax incentive)* accounts for reported profits resultant from their PS activity.

Unlike Hines and Rice (1994), who used cross-section country data, our work is based on affiliate-level panel data. From the basic equation below, we estimate:

$$\begin{aligned} Ln(\pi_{it}) = {} & \beta_1 + \beta_2 lnA_{it} + \beta_3 lnL_{it} + \beta_4 lnK_{it} \\ & -\gamma(Tax\ incentive_{it}) + \phi_i + \rho_t + u_i; \end{aligned} \tag{5}$$

where t indicates the time period and the sample units *i* are individual companies, and where ϕ_i denotes subsidiary fixed effects that account for unobservable

characteristics constant over the period (like their know-how or their transfer pricing policy) and ρ_t the time period dummies, which control for common shocks over the years (like the recent economic crisis).

It is essential to know the particular definition of the tax incentive variable to interpret the results of the estimation correctly, taking into account the negative relationship between taxes and reported profits in a particular territory derived from the PS activity. If the tax incentive measure is the tax rate of the local jurisdiction where profits are reported, it is clear that PS activity should lead to estimating a negative effect. However, if the measure is a tax rate difference between territories, the interpretation depends on how the subtraction has been calculated.

We use a simple tax rate difference between territories (the subsidiary and the MNE residence country) as a proxy for the international tax incentive to shift profits, in the same way as some earlier authors (Mills and Newberry, 2004; Clausing, 2009; Dischinger, 2010; Blouin et al., 2011; Dischinger and Riedel, 2011; Becker and Riedel, 2012; or Dischinger et al., 2014). In particular, the difference between the Spanish tax rate and the respective tax rate of the OECD and/or EU country where the parent company of the subsidiary is situated ($T_{ES} - T_{EX}$) is calculated for the sample of Spanish subsidiaries, and the difference between the tax rate of the EU country where the subsidiary is located and the Spanish tax rate is calculated for the sample of foreign subsidiaries ($T_{EU} - T_{ES}$).

Thus, we only analyse PS activity between a parent company and one of its subsidiaries: that located in Spain, for the sample of Spanish subsidiaries, and each one of the subsidiaries located in the EU, for the sample of EU subsidiaries owned by Spanish groups. Therefore, neither PS between parent companies and all their subsidiaries, nor PS between subsidiary companies is analysed (although this last analysis could shed also light on PS related to Spain, which is our objective).

The indicator of the tax rates is the top statutory CIT rate[3] of the countries (including local taxes) and the information comes from KPMG (2006) and the

[3] While it is true that tax bills not only depend on the nominal tax rates but also on the definition of the tax bases, according to Devereux and Maffini (2007) statutory tax rates are the best indicator for measuring the response to taxes at this stage of the decision making of multinational corporations, i.e., statutory tax rates are the best indicator of the tax incentive to shift profits. As Devereux and Maffini (2007) asserted: "It is plausible to suppose that companies take advantage of any tax allowances in any jurisdiction in which they operate. Having done so, the advantage in being able to

KPMG website[4]. The expected effect of our particular tax incentive measure on reported profits is negative. For the sample of Spanish subsidiaries, as the Spanish tax rate increases (decreases) with respect to the foreign tax rate, reported profits in Spain should decrease (increase). And for the sample of EU subsidiaries, as the respective EU tax rate increases (decreases) with respect to the Spanish tax rate, reported profits in the EU country should decrease (increase). For the quantitative results, since the dependent variable (reported profits) is in logarithms and the tax incentive variable is in levels, γ directly gives the semi-elasticity of reported profits with respect to taxes.

Apart from the affiliate financial variables and the tax incentive, the Hines and Rice approach includes in the model the level of productivity of the territory where profits are generated. The level of productivity is measured as the logarithm of the GDP per capita. Because of the within transformation of the model (to which we refer later) and the limited variability of the Spanish GDP pc over time, this variable has been eliminated from the estimation for the sample of Spanish subsidiaries. The GDP pc of the EU territories for the sample of foreign subsidiaries is the real GDP pc in thousands of euros and is taken from the Eurostat website[5].

3.2 Data

As stated in the introduction, the objective of this study is merely to examine PS from or to Spain and thus, it is not possible to draw general conclusions from it about what happens worldwide, nor conclude that PS does not exist if no evidence for it is found.

The analyses rest on two samples of companies relating to Spanish territory, taken from the AMADEUS database (from the Bureau Van Dijk) for the period from 2005 to 2014. One sample encompasses Spanish subsidiaries owned by OECD and/or EU parent companies, and the other encompasses EU subsidiaries

transfer a dollar of profit from a high tax jurisdiction to a low tax jurisdiction depends on differences in the statutory rate" (p.12).

4 http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx

5 http://ec.europa.eu/eurostat/data/database

owned by Spanish parent companies. The limitation of this second sample to the EU (instead of taking a symmetric sample of OECD and EU subsidiaries owned by Spanish parent companies) is because the AMADEUS database only provides financial statements and ownership data for European companies.

For both samples we limit the analyses to non-financial subsidiaries owned by industrial parent companies.[6] Parent companies are those denominated Global Ultimate Owners (GUOs) in AMADEUS. In particular, the definition we took for the GUOs considers a minimum percentage for the path from a subject company to its GUO of 25.01%.

Moreover, we only had access to data from large and very large companies.[7] However, we consider this to have been an advantage because PS activity is usually carried out by this type of company. Therefore, we think the samples we consider are representative of the companies engaging in PS.

Initially, the sample of Spanish subsidiary companies comprised an unbalanced panel of 2,212 subsidiaries and the sample of EU subsidiary companies one of 550. For these two samples the following unconsolidated financial data were downloaded: profit before income tax expense as a measure of the dependent variable π (the AMADEUS variable PLBT), fixed assets as a measure of the input capital K (FIAS) and cost of employees as a measure of the input labour L (STAF), all of them in thousands of euros.

Following the previous literature, the annual observations of subsidiaries located in the same country and belonging to the same parent company were aggregated for each financial variable.[8] We only aggregated data for years in which financial information was available for all the eligible subsidiaries (those in the same country and belonging to the same parent company). Then, we

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6 According to the AMADEUS database, the category industrial companies includes all companies that are not banks or financial companies nor insurance companies.

7 According to the AMADEUS database, for a company to be categorized as large or very large it need only fulfil one of three criteria: turnover (>=10 and >=100 million euros for large and very large companies, respectively), total assets (>=20 and >=200 million euros, respectively) or total number of employees (150 and 1,000, respectively). Moreover, AMADEUS classifies the companies' size from the last available year in the database.

8 The number of aggregated units is the same as the number of parent companies for the sample of Spanish subsidiaries because in this case the only subsidiaries' country is Spain.

disregarded annual financial observations when data were not available for all the eligible subsidiaries for data consolidation.

Lastly, once the data were brought together, observations with a non-positive value were eliminated from the sample in order to transform the financial variables to logarithms. We also eliminated observations for which no data for the dependent variable (PLBT) were available.

As a result of this procedure, there are 1,169 units in the sample of Spanish subsidiaries, and 317 in the sample of EU subsidiaries. From now on we will call each of these aggregated units a subsidiary, although this is not entirely accurate.

4 Descriptive analysis of the sample

In the first place we looked at the series of values of our focal explanatory variable, the tax incentive. In the sample of Spanish subsidiaries, the number of times in which there is an absolute difference higher than or equal to 0.1 (which could be consider a high difference) is 2,076 (out of 7,294 observations). Moreover, this large difference exists for both sides of the distribution. The number of times in which the Spanish tax rate is higher than the foreign tax rate in 0.1 points is 457 (out of 3,533 positive observations) and the number of times in which the Spanish tax rate is lower than the foreign tax rate in 0.1 points is 1,619 (out of 3,761 negative observations).

We do not find such large differences in the sample of EU subsidiaries. The number of times in which the foreign EU tax rate is higher than the Spanish tax rate in 0.1 points is 0 (out of 699 positive observations) and the number of times in which the respective EU tax rate is lower than the Spanish tax rate in 0.1 points is 313 (out of 1,876 negative observations). For this sample the number of negative observations is much higher than the number of positive observations, which means that the Spanish tax rate is relatively high in comparison to the tax rate of the other EU countries.

Secondly, also relating to the tax incentive variable and the sample of subsidiaries, Table 1 and Table 2 provide information about the number of parent and subsidiary companies by country for each of the samples respectively. For the sample of Spanish subsidiaries, Table 1 shows the OECD and EU countries

Table 1: Spanish subsidiary companies: Number of GUOs by country

GUO country-ISO code-	Companies		
US (United States)	282	KR (Rep. of Korea)	8
LU (Luxembourg)	135	NO (Norway)	8
DE (Germany)	112	AT (Austria)	6
FR (France)	93	IL (Israel)	6
GB (United Kingdom)	92	MT (Malta)	6
JP (Japan)	84	AU (Australia)	5
NL (Netherlands)	82	CY (Cyprus)	4
IT (Italy)	52	PL (Poland)	3
CH (Switzerland)	43	CL (Chile)	2
BE (Belgium)	27	GR (Greece)	2
DK (Denmark)	27	TR (Turkey)	2
CA (Canada)	19	CZ (Czech Republic)	1
SE (Sweden)	18	IS (Iceland)	1
IE (Ireland)	16	NZ (New Zealand)	1
PT (Portugal)	11	SI (Slovenia)	1
MX (Mexico)	9	SK (Slovakia)	1

Table 2: EU subsidiary companies: Number of subsidiary companies by country

Subs. Country-ISO code-	Companies	Subs. Country-ISO code-	Companies
FR	57	GR	7
PT	57	BG	5
IT	47	SK	5
GB	37	NL	4
DE	22	SE	4
PL	19	AT	3
BE	14	MT	2
CZ	14	HU	1
RO	9	LT	1
IE	8	LU	1

investing in Spain ordered according to their importance in terms of number of parent companies. And for the sample of EU subsidiaries, Table 2 shows the Spanish EU investment destination countries of the sample, ordered according to their importance in terms of number of subsidiary companies. These tables give an idea of which countries and their corresponding tax rates could be most influential on the results.

Additionally Table 3 shows the number of subsidiaries by parent company for the sample of EU subsidiaries (owned by Spanish parent companies), which adds information about the higher influence of some of the Spanish parent companies that own EU subsidiaries to the results.

It seems from Table 1 that United States, Luxembourg, Germany, France, United Kingdom and Japan are the countries with the highest number of parent companies owning subsidiaries located in Spain. Within them, United States, Germany, France and Japan have relatively high statutory CIT rates.

From Table 2 we see that the most important EU countries for Spain in terms of number of subsidiaries are France, with a relatively high CIT rate, and Portugal, with a relatively low CIT rate.

Table 3 shows that there is a Spanish parent company with a greater influence on the results: it owns nine sample subsidiaries. However, the majority of parent companies (143 out of 194 Spanish parent companies) have the same representativeness in the sample because they own only one EU sample subsidiary (or sample unit).

Table 3: EU subsidiary companies: Number of subsidiaries by GUO

Number of GUOs	Number of subsidiaries by GUO
1	9
3	7
6	6
2	5
4	4
12	3
23	2
143	1

Additionally, Table 4 and Table 5 present the descriptive statistics of the basic model variables, and Table 6 and Table 7 the correlation matrix of the explanatory variables.

Table 4: Spanish subsidiary companies: Descriptive statistics (€ thousand)

	N	Mean	SD	Min	Max
Π	7,294	10,356.98	79,290.4	0.13	5,430,267
K	7,242	64,002.91	314,802.8	0.14	11,900,000
L	6,915	16,156.45	44,388.83	0.99	668,475.2
$T_{ES} - T_{EX}$	7,294	-0.01	0.06	-0.10	0.25

Table 5: EU subsidiary companies: Descriptive statistics (€ thousand)

	N	Mean	SD	Min	Max
Π	1,876	5,432.72	23,814.16	0.54	560,693.3
K	1,853	41,657.49	254,987.6	1.35	8,835,699
L	1,667	7,385.66	22,129.19	1.69	339,238.8
GDP pc	1,876	24.66	8.97	4.6	78.1
$T_{EU} - T_{ES}$	1,876	-0.03	0.06	-0.22	0.05

Table 6: Spanish subsidiary companies: Correlation matrix

	K	L	$T_{ES} - T_{EX}$
K	1		
L	0.43	1	
$T_{ES} - T_{EX}$	0.05	0.04	1

Table 7: EU subsidiary companies: Correlation matrix

	K	L	GDP pc	$T_{ES} - T_{EX}$
K	1			
L	0.62	1		
GDP pc	0.08	0.10	1	
$T_{EU} - T_{ES}$	0.07	0.09	0.65	1

5 Results

5.1 Spanish subsidiary companies

Panel data techniques have been used to derive the effect of the international tax incentive to shift profits on Spanish reported profits, since the sample of subsidiaries is observed for a ten-year period and there is a strong likelihood that there are unobservable heterogeneous characteristics among them affecting profits, which panel data techniques let us control for (i.e., PS policy, management policy, etcetera). Specifically, according to the Hausman test a Fixed Effects model was estimated. This method solves the endogeneity problem caused by unobservable features of subsidiary companies which affect reported profits to be correlated with observable explanatory variables. We present our results in Table 8.

The results are in line with the empirical literature (Heckemeyer and Overesch, 2013; Dharmapala, 2014). A negative relationship between the tax incentive to shift profits and reported profits arises after controlling for the inputs labour and capital. That corroborates that subsidiary companies located in Spain are involved in PS. Spanish companies report profits lower (higher) than true profits when the Spanish tax rate is higher (lower) than the foreign tax rate of the country where the parent company is located.

Particularly, a semi-elasticity of 2.74 has been estimated, which indicates that if the simple tax rate difference (the Spanish tax rate minus the tax rate of the parent company country) increases by 10 percentage points, reported profits in Spain decrease by 27.40%. This means that, for example, the Spanish tax rate falling from 30% to 28% (a reduction of 2% points) in 2015 should have led to a

Table 8: Basic Results

LnL	0.66 (13.58)***
lnK	0.05 (2.38)**
$T_{ES} - T_{EX}$	-2.74 (-4.27)***
N	6,890
R^2	0.10
Subsidiary FE	Yes
Year dummies	Yes

Note: lnL is the logarithm of the cost of employees; lnK is the logarithm of the fixed assets; and $T_{ES} - T_{EX}$ is the difference between the Spanish tax rate and the tax rate of the foreign country where the parent company is situated. Subsidiary Fixed Effects and Year dummies are also included and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

5.48% increase in reported profits in Spain (assuming all else being equal). This is an estimated semi-elasticity slightly higher than that of the empirical literature, given the mean tax semi-elasticity of –1.78 for the group of studies using after-financing profits summarized in Heckemeyer and Overesch (2013:29).

Although the results are in line with the literature, at this point we would like to voice some concerns relating to the calculation of the tax incentive measure. As we stated above, our only aim is to measure PS activity from or to Spain, and specifically in this section PS activity between the Spanish subsidiaries and their respective OECD and/EU parent company, similarly to other studies that examine PS between parent and subsidiaries.

In doing so, however, one should not forget that PS is an internal practice within a multinational group. PS between Spain and the residence country of the group could not be only explained by the difference in their respective tax rates, but also by the difference between the Spanish CIT rate and the other affiliated subsidiaries' tax rates. Hence, results could be overstated or undervalued, and it may be necessary to control for the other affiliated companies' tax rates.

Huizinga and Laeven (2008), De Simone (2016) and Markle (2016) use a measure of the tax incentive that captures all taxes of the countries in which the multinational groups operate (although they do not take into account the tax rate of the other affiliated companies when analysing PS between a subsidiary and its respective parent company,[9] either). Moreover, their measure considers the opportunity for this activity to exist between the different affiliated companies by weighting the tax rates of the countries where they are situated by the level of real economic activity of the affiliates within their borders.

Additionally, apart from the level of real economic activity, there may be other company characteristics which limit the PS activity between any affiliates of a group. For example, according to Huizinga and Laeven (2006), while subsidiaries within a group may perform similar tasks, the same is not true between subsidiaries and parent companies, giving greater scope for transactions and thus, for shifting profits. In this case, comparing the tax rate of parents and subsidiaries (and particularly here, a sole subsidiary) might be a good approximation of the PS activity between Spain and their main investment partner countries because of the special role of parent companies within multinational firms.

5.2 Impact on tax revenue

Taking the estimated semi-elasticity of the tax incentive on reported profits, we can perform a simple calculation of the consequences for Spain's tax revenue of the disappearance of PS activity, after making some important assumptions. First, it is necessary to assume that the elimination of PS activity does not change the MNEs' investment decisions, all else being equal. And second, that the average semi-elasticity is the same for all years in the sample and for any tax rate difference (high and low tax rate differences).

Bearing these assumptions in mind, the difference in terms of tax revenues for Spain was calculated for each year between 2005 and 2014 in a similar vein to Clausing (2009). To that end, reported profits in absence of the distorting PS activity (i.e. actual or real profits derived from real economic activity) were

[9] However, their analyses include several companies of the same multinational group.

calculated from the estimated semi-elasticity of reported profits to taxes. The results are shown in Table 9.

As reflected in Table 9, it seems from our sample of Spanish subsidiary companies that during the period 2005-2014, Spain has both gained and lost revenue due to PS activity, notably in 2014, when it could have earned substantial additional tax revenues if PS activity had disappeared. According to our results, the years in which Spain would have seen a net loss from PS were 2005, 2006, 2007, 2012 and 2014. This means that in those years reported profits in Spain were lower than actual profits, which is consistent with Spain's high CIT rate during the three first years of the sample. A deeper analysis is needed to find the reasons behind the results for 2012, and especially, 2014. And the years for which reported profits in Spain were higher than real profits were 2008, 2009, 2010, 2011 (when the Spanish CIT rate was reduced) and 2013.

We do not intend to provide a general figure nor make a general assessment of the consequences of PS in terms of tax revenues for Spain for the whole period, for several reasons. In the first place, we want to be cautious because of the assumptions made to derive these results. Secondly, as mentioned above, the tax incentive effect we used to estimate the tax revenues could be overstated or undervalued, depending on the tax rates of the other affiliated companies in the groups. And thirdly, one needs a complete picture of the Spanish companies in

Table 9: The impact on Spain's tax revenue of eliminating profit shifting activity, 2005–2014 (€ thousand)

	Spanish CIT rate	Reported Profits	Actual Profits	Difference in Profits	Difference in CIT revenues
2005	0.35	4,550,121.12	4,686,129.84	136,008.71	47,603.05
2006	0.35	6,885,672.07	7,387,158.11	501,486.03	175,520.11
2007	0.325	7,972,168.03	8,059,932.89	87,764.86	28,523.58
2008	0.3	6,832,294.57	6,578,175.49	-254,119.07	-76,235.72
2009	0.3	7,307,299.21	6,999,731.71	-307,567.50	-92,270.25
2010	0.3	7,669,336.8	7,426,842.45	-242,494.34	-72,748.30
2011	0.3	6,828,087.5	6,638,790.48	-189,297.02	-56,789.10
2012	0.3	9,480,885.69	9,637,057.11	156,171.42	46,851.42
2013	0.3	7,107,661.71	7,069,800.34	-37,861.36	-11,358.40
2014	0.3	10,910,274.8	12,225,958	1,315,683.23	394,704.96

order to evaluate the actual tax revenue consequences for Spain. This means that the same analysis needs to be performed for a symmetric representative sample of foreign companies owned by Spanish parent companies.

Despite the caveats we pointed out with regard to the tax revenue results, it is worth examining and explaining the figures behind them. To make it easier to follow the explanation we added Appendix 2, which contains more disaggregated information about these results.

Tax revenue results depend on the level of the CIT rate of the main investor countries in Spain, in comparison to the Spanish rate. As a first step, if we look at the evolution of the number of (Spanish subsidiary companies) observations by parent company's country and year (Table A2.1 of Appendix 2), this gives us a preliminary idea of which countries have the most influence on the results. United States has the highest number of observations for all years (as also shown in Table 1, it is the most important country in terms of location of parent companies).

As shown in Table A2.3 of Appendix 2, the US tax rate is higher than the Spanish one over the whole sample period. That must mean that there are also other important foreign investor countries in Spain which have a low CIT rate. If not, results from the elimination of PS would have been negative in all years. We can see that the number of observations is also high for Germany, Luxembourg, Japan, France and the United Kingdom, which according to Table 1 are the other important countries in terms of location of parent companies.

Disaggregated data on the differences in profits from eliminating the effect of PS behaviour (differences between actual and reported profits) by parent company country and year can be seen in Table A2.2 of Appendix 2. Particularly, this table shows the percentage of total differences that these differences account for, where a positive sign indicates that PS was harmful for Spain (because the Spanish tax rate was higher than the foreign tax rate and thus Spain could have earned additional euros if PS had not existed) and a negative sign that it had a positive effect on reported profits (because the Spanish tax rate was lower than the foreign tax rate). The highest positive differences from eliminating the PS effect come from the United Kingdom (all years but 2005, 2008 and 2013) and Switzerland (for the years 2005, 2008 and 2013), notably the positive difference in 2014 coming from the United Kingdom (which represents 106.98% of the positive difference of that year). Another crucial country in terms of shifting profits out of

Spain is Ireland. On the other hand, the highest negative differences come from the US.

Table A2.3 and Table A2.4 of Appendix 2 display separately each of the two components responsible for these differences in profits. Table A2.3 displays the nominal CIT rates of the parent companies' country over the years[10] and Table A2.4 contains information about the Spanish reported profits by parent company's country and year. We can conclude that the main countries responsible for the results are the United Kingdom, with a harmful effect of PS on Spanish reported profits, and the United States with a beneficial one. These are the countries with the highest volume of reported profits in Spain, especially the very high percentage of 52.32% for the United Kingdom in 2014, which justifies the positive result in terms of tax revenues of removing PS shown in Table 9.

5.3 EU subsidiary companies

We also estimated a Fixed Effect model for this other sample of EU subsidiaries. Table 10 shows the results.

As shown in Table 10, the effect of the tax incentive is similar to that obtained from the larger sample of Spanish subsidiaries. Taxes affect reported profits negatively and the semi-elasticity estimated is 2.99. If the tax rate difference (the EU tax rate minus the Spanish tax rate) increases by 10% points, reported profits in the respective EU country decrease by 29.9%. As in the previous sample, one needs to be cautious with this result. Our tax incentive measure always compares the foreign tax rates to the Spanish one (and in this case the foreign tax rates are only those of the EU) and is only based on the tax rates of two of the countries where multinational groups operate.

The evaluation of the results in terms of tax revenues makes no sense for this other sample because it is not symmetric to the earlier one. However, in order to have comparable results for the two samples of companies relating to Spain, i.e. national and foreign MNE, we additionally estimated a smaller symmetric sample of Spanish subsidiaries owned exclusively by EU countries. Again, we got a very

[10] According to Table A3.3 the highest tax rate difference is reached in 2005 and 2006. This is the difference with Cyprus when the Cypriot tax rate was 10% and the Spanish one 35%.

Table 10: Basic Results

LnL	0.54 (7.12)***
lnK	0 (0.31)
$T_{EU} - T_{ES}$	-2.99 (-1.98)**
In(GDP pc)	-0.65 (-0.86)
N	1,648
R^2	0.09
Subsidiary FE	Yes
Year dummies	Yes

Note: lnL is the logarithm of the cost of employees; lnK is the logarithm of the fixed assets; $T_{EU} - T_{ES}$ is the difference between the tax rate of the EU country where the subsidiary company is situated and the Spanish tax rate; and In (GDP pc) is the logarithm of the GDP pc of the country where the subsidiary company is located. Subsidiary Fixed Effects and Year dummies are also included and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

similar negative semi-elasticity of 2.94 for the Spain-EU limited scenario. Results for this limited sample can be seen in Appendix 3.

Consequently, the effect of taxes on reported profits barely changes when we exclude the OECD (and non-EU) countries from the calculation of the tax incentive. Taking into account the disaggregated figures of Appendix 2, for this limited sample of Spanish subsidiaries we can predict more positive results in terms of tax revenues for Spain, since the most important countries in terms of reported profits are the United Kingdom and the United States, and the latter is excluded from the calculation of the tax incentive. The same more positive results can be foreseen for the sample of EU subsidiaries since its estimated semi-elasticity is also very similar.

6 Additional analyses and robustness tests

This section includes some additional analyses and robustness tests to check the consistency of our results and to analyse the effect of some interesting features relating to the companies and the tax incentive. We concentrate on the Spanish subsidiaries sample because is the largest one and the sample used to calculate the tax revenue results, but similar results can be found in Appendix 4 for the sample of EU subsidiaries.

6.1 Additional explanatory variables

In the first place the basic model is broadened by adding some other explanatory variables which could impact reported profits in a territory. When thinking about possible additional variables, it is useful to distinguish between different groups of them depending on affiliate, multinational group and country level characteristics. Moreover, because our model includes Subsidiary FE, which absorbs the impact of subsidiary time-constant variables, and also the effect of other non-subsidiary related constant variables, we need to think of factors which show certain trends over time.[11]

Following the empirical literature, the basic model is broadened by introducing two characteristics related to the economic situation of the country: the Spanish GDP pc growth and the inflation rate, measured by the consumer price index, both taken from the World Bank website[12]. Regarding the expected impact of these variables, if profits are pro-cyclical the effect of GDP pc growth on profits will be positive (Lohse and Riedel, 2013:9). More doubts emerge relating to the effect of the inflation rate. According to Azémar (2010:240), inflation could also be used as an indicator of a country's macroeconomic instability. Thus, it may have a negative impact on reported profits. On the other hand, it may lead to overstating companies' profits and then have a positive impact on reported profits (Loretz and Mokkas, 2015:17).

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[11] This is the reason why we did not include the level of productivity of Spain measured by its GDP pc.

[12] http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

Results are shown in column two of Table 11. The basic model variables and particularly the tax incentive are robust to the introduction of the two additional variables. For these last variables, the pro-cyclical behaviour of profits is confirmed for the GDP pc growth variable and the inflation rate has a negative impact, which is in line with the higher instability hypothesis.

Instead of controlling for the previous two additional explanatory variables, we can directly check the impact of the economic crisis on profits by introducing a binary variable taking the value of 1 for the years 2008 on (including 2008), and zero otherwise. As a consequence of the pro-cyclical behaviour of profits, the expected sign of this variable is negative. Moreover, the crisis could have also affected reported profits through the tax incentive measure if it had led to taxes having a different impact on reported profits. For example, the crisis could have facilitated some tax planning strategies to transfer profits. To check this hypothesis, we constructed the interaction variable crisis*$(T_{ES} - T_{EX})$.

Results in column three of Table 11 corroborate our expectations: the crisis impacted reported profits negatively. Additionally, column four of Table 11 shows that the effect of the tax incentive variable is more negative for the crisis years.

Besides the crisis variable, there may be other factors modifying the effect of the tax incentive on reported profits. We are particularly interested in checking the possible distinct effect of taxes depending on the level of intangible assets used by companies, on the one hand. And on the other, we intend to test the different effect of the tax incentive depending on whether the Spanish tax rate is higher or lower than the foreign tax rate, and the level of the tax rate differences.

First, as mentioned above, intangible assets could facilitate the transfer pricing strategy to shift profits because of their uniqueness and the difficulty of setting an arm's length price for them. Here, one could expect taxes to affect reported profits more negatively as corporations have a higher level of intangible assets. However, as we also remarked in the second section, at the same time intangible assets usually have a positive impact on profitability and thus on reported profits. This could make companies less sensitive to taxes.

Concurrently, the use of intangible assets varies throughout the different economic sectors. Thus, one way to evaluate the impact of this kind of asset on reported profits is to identify economic sectors with a high level of intangible assets and evaluate the effect of the tax incentive for them. According to Mas and Quesada (2014:66), the sectors in Spain with the highest level of intangible assets

in relation to the output they generate are coke and refined petroleum products; chemical products; computer, electronic and optical products; and manufacture of transport equipment.

We construct the binary variable Sector, which takes the value of one for subsidiaries whose parent companies belong to one of the aforementioned economic sectors with a high level of intangible assets, and zero otherwise. We take the sector of the parent companies into account, rather than the sector of the subsidiaries, because the aggregation process we carried out to construct our sample units does not allow us to identify only one economic sector for each sample unit.

Finally, the variable added to the basic model is the interaction term Sector*$(T_{ES} - T_{EX})$, whose effect is not determined and will depend on the predominant effect of intangible assets on reported profits.

As presented in column five of Table 11 it seems that companies with a high level of intangible assets are less sensitive to PS strategies. Although PS opportunities increase in the presence of a high level of intangible assets, in the end the positive effect of intangible assets on real profits seems to dominate.

For the tax incentive effect depending on tax rate levels, in the first place according to Dischinger et al. (2014:257–268), PS semi-elasticity from parents to affiliates is lower than that from affiliates to parents. If this was true, the tax semi-elasticity should be higher when the Spanish tax rate is higher than the foreign tax rate. In this case the interaction term Hight*$(T_{ES} - T_{EX})$ is generated, where Hight is a binary variable which takes the value of 1 when the subsidiary tax rate is higher than the parent company tax rate, and zero otherwise. In the second place, it is possible that the relationship between tax incentive and PS is not linear. To check it the quadratic term $(T_{ES} - T_{EX})^2$ is generated.

Results for these two additional tests are in column six and seven of Table 11 respectively. It seems from our sample of Spanish subsidiaries that neither the situation in which the Spanish tax rate is higher than the foreign tax rate and profits go from subsidiaries to parent companies, nor the high tax rate differences increase the negative impact of taxes on profits.

Results for the sample of EU subsidiaries can be seen in Table A4.1 of Appendix 4. The effects on reported profits from the capital and labour inputs and the tax incentive variable also remain comparable to those of the basic specification in general terms (the tax incentive variable becomes statistically non-

significant in column six). However, for this sample the additional explanatory variables are not statistically significant except for the crisis variable, which has a surprising counter-cyclical effect on reported profits.[13]

Table 11: Additional explanatory variables

	GDP pc growth; Inflation (2)	Crisis (3)	Crisis* $(T_{ES} - T_{EX})$ (4)	Sector* $(T_{ES} - T_{EX})$ (5)	Hight* $(T_{ES} - T_{EX})$ (6)	$(T_{ES} - T_{EX})^2$ (7)
LnL	0.66	0.66	0.67	0.72	0.67	0.67
	(13.58)***	(13.58)***	(13.54)***	(14.18)***	(13.59)***	(13.58)***
lnK	0.05	0.05	0.05	0.02	0.05	0.05
	(2.38)**	(2.38)**	(2.35)**	(1.00)	(2.37)**	(2.36)**
$T_{ES} - T_{EX}$	-2.74	-2.74	-2.20	-3.42	-3.47	-2.66
	(-4.27)***	(-4.27)***	(-3.09)***	(-3.89)***	(-4.55)***	(-4.06)***
GDP pc growth	0.04					
	(5.99)***					
Inflation	-0.02					
	(-2.94)***					
Crisis		-0.26	-0.27			
		(-7.20)***	(-7.29)***			
Crisis* $(T_{ES} - T_{EX})$			-0.66			
			(-1.85)*			
Sector* $(T_{ES} - T_{EX})$				2.35		
				(1.86)*		
Hight* $(T_{ES} - T_{EX})$					1.87	
					(1.53)	
$(T_{ES} - T_{EX})^2$						4.03
						(0.95)

Table 11 continued

[13] The effect of the crisis variable becomes negative when we remove the time period binary variables from the regression.

Table 11 continued

	GDP pc growth; Inflation (2)	Crisis (3)	Crisis* $(T_{ES} - T_{EX})$ (4)	Sector* $(T_{ES} - T_{EX})$ (5)	Hight* $(T_{ES} - T_{EX})$ (6)	$(T_{ES} - T_{EX})2$ (7)
N	6,890	6,890	6,890	4,945	6,890	6,890
R^2	0.10	0.10	0.10	0.09	0.10	0.10
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: lnL is the logarithm of the cost of employees; lnK is the logarithm of the fixed assets; and $T_{ES} - T_{EX}$ is the difference between the Spanish tax rate and the tax rate of the foreign country where the parent company is situated. Additionally, in column (2) the GDP pc growth and the inflation rate of Spain, measured by the consumer prices index, are included. In columns (3) and (4) the crisis binary variable and this last variable plus the interaction term Crisis*$(T_{ES} - T_{EX})$ are respectively included. The interaction terms Sector*$(T_{ES} - T_{EX})$ and Hight*$(T_{ES} - T_{EX})$ are respectively added to the basic model in columns (5) and (6). Sector is a binary variable that identifies economic sectors of parent companies intensive in intangible assets; Hight is a binary variable that identifies situations in which the tax rate of the subsidiaries is higher than the tax rate of the respective parent company; in column (7) the quadratic term $(T_{ES} - T_{EX})^2$ is added. All specifications include Subsidiary Fixed Effects and Year dummies and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

6.2 Alternative indicators of the input variables

Table 12 presents the results for the initial basic model specification taking different combinations of indicators for the capital and labour input variables. Total assets (TOAS) and tangible fixed assets (TFAS) are taken as alternative indicators for the capital input (our basic indicator being fixed assets, FIAS), and number of employees (EMPL) as alternative labour input indicator (our basic indicator being the cost of employees, STAF).

Results for the tax incentive variable are slightly lower than those obtained using our preferred indicators for the input variables, when the semi-elasticity estimated was of 2.74. The most striking results are related to the introduction of the total assets variable, when the coefficient R^2 increases and those of the input variables change, especially for capital.

However, results for the tax incentive variable are somewhat different for the sample of EU subsidiaries (Table A4.2 of Appendix 4), for which the highest semi-elasticity is reached for the combination of inputs total assets and cost of employees (4.11), and for which the tax incentive is not statistically significant for the scenario consisting of number of employees/fixed assets and number of employees /tangible fixed assets.

Table 12: Alternative indicators

	TOAS, STAF	TFAS, STAF	FIAS, EMPL	TOAS, EMPL	TFAS, EMPL
LnL	0.37	0.66	0.58	0.21	0.58
	(8.16)***	(13.50)***	(12.60)***	(4.54)***	(12.71)***
lnK	0.67	0.02	0.06	0.75	0.04
	(17.87)***	(1.13)	(3.33)***	(19.94)***	(2.26)**
$T_{ES} - T_{EX}$	-2.20	-2.58	-2.55	-2.02	-2.47
	(-3.46)***	(-3.99)***	(-3.93)***	(-3.17)***	(-3.78)***
N	6,915	6,779	6,729	6,754	6,625
R^2	0.16	0.10	0.07	0.14	0.07
Subsidiary FE	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes

Note: lnL is the logarithm of the cost of employees or the logarithm of the number of employees, as indicated at the first row of the table; lnK is the logarithm of the fixed assets, the logarithm of total assets or the logarithm of tangible fixed assets, as indicated at the first row of the table; and $T_{ES} - T_{EX}$ is the difference between the Spanish tax rate and the tax rate of the foreign country where the parent company is situated. Subsidiary Fixed Effects and Year dummies are also included and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

7 Conclusions

This paper describes the PS activity of MNEs, reviewing the empirical literature on the subject, and then examining the existence of such activity from the perspective of Spain. Particularly, two samples of companies are studied for the period 2005–2014. One sample consists of Spanish subsidiaries owned by OECD

and EU parent companies, and the other consists of EU subsidiaries owned by Spanish companies.

In line with the empirical literature, indirect evidence consistent with PS is obtained. Our results indicate that reported profits in the different territories in which a multinational group operates are altered by taxes and the relationship between the two variables is negative. When the tax rate differences between Spain and the foreign countries vary by one percentage point, reported profits vary by around 2.7–3%.

We also conducted a series of additional analyses and robustness tests, and in general terms the tax incentive variable remains similar to the initial result. This is true when the model is broadened to include other explanatory variables, or when different combinations of the input variables indicators are considered, especially for the sample of Spanish subsidiaries. With regard to our preferred sample of Spanish subsidiaries, results show that reported profits are pro-cyclical and that the recent economic crisis affected reported profits negatively. We also obtained that the effect of the tax incentive on profits is less negative when companies have a high level of intangible assets, which could be explained by companies being less sensitive to taxes when profitability is high. Furthermore, it seems that the magnitude of the tax incentive does not depend on the Spanish tax rate being higher or lower than the foreign tax rate, nor on the size of the difference in such tax rates.

Results in terms of tax revenues for Spain of this PS activity from the sample of Spanish subsidiaries vary over the years and depend on the higher or lower tax rate level of the main investor countries in Spain. Actual profits seem to have been higher than reported profits during the first years (2005, 2006, 2007) when the Spanish tax rate was relatively high, and also in 2012 and 2014 due to the high reported profits in Spain originating in the United Kingdom, a country with a relatively low CIT rate. The years for which PS activity seems to have had a positive impact on Spanish tax revenues (actual profits were lower than reported profits) are 2008, 2009, 2010, 2011 and 2013. The United States is mainly responsible for this other result as a consequence of its relatively high CIT rate and high reported profits in Spain.

Finally, some additional analyses related to the tax incentive variable and the samples are open to future research. We will try to incorporate the tax rate of other affiliated companies into the tax incentive measure as long as PS is an internal

activity within multinational groups. And for our samples of companies, we will also try to increase the sample of EU subsidiaries to take into account all the important countries for Spain in terms of affiliated companies situated there, especially the US, and have a complete overview of PS activity in relation to Spain.

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Appendix 1: Review of the empirical literature on profit shifting activity of multinational enterprises motivated by corporate income taxes. Hines and Rice approach

	Sample[a]	Profits and Tax Incentive	Real Economic Activity and FE	Additional Control Variables and Additional Analyses
Azémar (2010)	Treasury Corporate Tax Files; 1992,1994,1996,1998 and 2000; Results[b]*: 2.75	Ln (Pre-tax profits); Tax rate (average tax rate)	Ln (Total assets); Ln(GDP pc) Country FE; Year FE	Country: Ln (GDP); Ln (Trade openness); Ln (Inflation); Ln (Exchange rate); Ln (Physical infrastructure); Law and order index and an interaction term with the tax incentive; Taxes effect on repatriated dividends and Subpart F income
Becker and Riedel (2012)	AMADEUS; 1995-2006; Results*: 0.78	Ln (Pre-tax profits); Simple tax rate difference (statutory tax rate)	Ln(Fixed assets); Ln(GDP pc) Industry FE; Year FE	Country: Ln(Population subsidiaries); Ln(Unemployment subsidiaries); Ln(Population parents); Ln(Unemployment parents); Ln(GDP pc parents)
Blouin et al. (2011)	BEA; 1982-2005; Results*: 0.31	Ln (Pre-tax profits); Simple tax rate difference (foreign marginal tax rate and US statutory tax rate)	Ln (Cost of employees); Ln (Total assets); Ln (GDP pc); Industry FE; Year FE	MNE: Conflicting situation (trade-off between minimising CITs and customs duties) dummy and an interaction term with the tax incentive
Clausing (2009)	BEA; 1982-2004; Results*: 3.39	Pre-tax profits/Sales; Simple tax rate difference (effective tax rate)	Through the denominator of the dependent variable	PS effect on US revenue collection
De Simone (2016)	AMADEUS; 2003-2012; Results*: 0.74	Ln (Pre-tax profits); Weighted tax rate difference (statutory tax rate and taking operating revenues as the weighting factor)	Ln (Cost of employees); Ln (Tangible fixed assets); Ln (GDP pc); Country FE; Year FE; Industry FE	Affiliate: Observations that are listed dummy; Observations that are listed as the GUO dummy; Country: Interaction term between the adoption of a common set of accounting standards dummy and the tax incentive

Dischinger (2010)	AMADEUS; 1995-2005; Results*: 1.6	Ln (Pre-tax profits/Number of employees); TR (statutory tax rate); Simple tax rate difference (statutory tax rate)	Ln (Cost of employees/Number of employees); Ln (Fixed assets/ Number of employees); Ln (GDP pc); Affiliate FE; Year FE	Affiliate: Debt ratio; MNE: Ownership share and an interaction term with the tax incentive; Country: Ln (GDP); Ln (Unemployment); Ln (Corruption index)
Dischinger et al. (2014)	AMADEUS; 1995-2007; Results**: 0.5	Ln (Pre-tax profits); Simple tax rate difference (statutory tax rate)	Ln(Cost of employees); Ln(Fixed assets); Ln(GDP pc); Affiliate FE; Year FE; Industry FE	Affiliate: Log (Subsidiary total assets /Parent company total assets) and an interaction term with the tax incentive; MNE: Ln (Number of entities in the corporate group) and an interaction term with the tax incentive; Country: High tax subsidiary dummy and an interaction term with the tax incentive; Corruption; Log(GDP)
Dischinger and Riedel (2011)	AMADEUS; 1995-2005; Results*: 3.2	Ln (Pre-tax profits); Simple tax rate difference (tax rate of the considered subsidiary minus the unweighted average tax rate of all other group members, subsidiaries and the parent company)	Ln (Cost of employees); Ln (Fixed assets); GDP pc; Affiliate FE; Year FE	MNE: Interaction term between the intangible intensity at low tax affiliates dummy and the tax incentive; Interaction term between the difference in intangibles intensity at low and high tax affiliates within the group variable and the tax incentive; Country: Country R&D expenses(%GDP); Population; Corruption index; GDP pc growth; Unemployment; Taxes effect on intangible assets location

Grubert (2003)	Treasury Corporate Tax Files; 1996; Results*: 0.8	Pre-tax profits/Sales; Tax rate (statutory tax rate)	Assets/Sales; GDP pc;	Affiliate: age<5 years; age 5-15 years; Debt/Asset; MNE: Parent R&D/Sales; Parent advertising/Sales; Parent domestic profits/Sales; an interaction terms with the tax incentive; Ln (Parent sales); The links between intangible income, intercompany transactions, income shifting and the choice of location; Main PS strategies
Grubert (2012)	Treasury Corporate Tax Files; 1996 and 2004; Results*: 1.29	Change in Pre-tax Profits/Sales Change in tax rate (MNE's Average Effective Foreign tax rate)	Through the denominator of the dependent variable	Affiliate: A dummy for companies incorporated after 1980; Ln (Sales), 1996; Change in worldwide profis/Sales; MNE: Parent R&D/Sales, 2004; Parent advertising/Sales, 2004; Interaction term with the tax incentive; Country: Average effective foreign TR 1996 Explanation on the growing share of U.S. MNE income abroad from the firm level results
Grubert and Mutti (1991)	BEA; 1982; Results**: 0.37	Post-tax profits/Sales; Post-tax profits/Equity; Tax rate (statutory tax rate; average effective tax rate)	Through the denominator of the dependent variable;	Country: GDP growth rate between 1975 and 1982
Hines and Rice (1994)	BEA; 1982; Results*: 12.29	Ln (Pre-tax earnings); Ln (Pre-tax profits); Tax rate (average tax rate)	Ln (Cost of employees); Ln (Fixed assets); Ln (GDP pc)	

Huizinga and Laeven (2008)	AMADEUS; 1999; Results*: 1.21	Ln (Pre-tax earnings); Weighted tax rate difference (statutory tax rate and taking sales as the weighting factor)	Ln (Cost of employees); Ln (Fixed assets); Ln (GDP pc); Industry FE	Affiliate: A dummy variable indicating Eastern European firms and an interaction term with the tax incentive; Total debt/Total assets; Country: Corruption
Lohse and Riedel (2013)	AMADEUS; 1999-2009; Results**: 0.4	Ln (Pre-tax earnings); Tax rate (statutory tax rate);	Ln (Cost of employees); Ln (Fixed assets); GDP pc; Affiliate FE; Industry-year FE;	Country: Transfer Pricing rules and interaction terms with the tax incentive; GDP; GDP growth; Unemployment; Corruption; Linear time trend and an interaction term with the tax incentive
Loretz and Mokkas (2015)	AMADEUS; 2003-2011; Results**: 0.06	Post-tax profits/Total assets; Tax rate (statutory tax rate)	Ln (Number of employees); Ln (Tangible assets) Affiliate FE; Year FE	Affiliate: Share intangibles; Leverage; Country: GDP pc growth; Ln(Inflation); Interest rate; Corruption index
Markle (2016)	ORBIS; 2004-2008; Results**: 0.94	Ln (Pre-tax profits); Weighted average tax rate (statutory tax rate and taking operating revenues as the weighting factor)	Ln (Cost of employees); Ln (Tangible fixed assets); Ln (GDP pc); Parent company FE; Year FE	Country: Home country taxation dummy and an interaction term with the tax incentive
McDonald (2008)	Treasury Corporate Tax Files; 1996, 2000 and 2002; Results*: 1.23	Pre-tax earnings/Sales; Tax rate (statutory tax rate)	Assets/Sales	Affiliate: age<5 years; age 5-15 years; MNE: Parent R&D/Sales; Parent advertising/Sales; Parent domestic profits/Sales; Ln (Parent sales). Cost sharing arrangements and an interaction term with the tax incentive

Mills and Newberry (2004)	Treasury Corporate Tax Files; 1987-1996; Results*: 1.94	Pre-tax profits/Assets; Pre-tax profits/Sales; Simple tax rate difference (US statutory tax rate and average tax rate of the foreign parent company, excluding US; statutory tax rate)	Through the denominator of the dependent variable; Year FE; Industry FE; Parent country FE	Affiliate: Altman's bankruptcy predictor score; Age; Sales/Worldwide sales; MNE: Intangible assets/Assets; Pre-tax profits/Assets; Tax incentive effect on the debt levels
Schwarz (2009)	BEA; 1999-2001; Results*: 2.27	Pre-tax profits/Sales; Pre-tax profits/Assets; Tax rate (statutory tax rate; effective tax rate)	Through the denominator of the dependent variable;	Country: GDP growth; Political risk; Replacing the dependent variable by Equity capital/(Equity capital +debt) and Retained earnings/Stocks
Weichenrieder (2009)	MiDi; 1996-2003; Results*: 0.80	Post-tax profits/Total assets; Tax rate	Ln (Employment), Ln (Fixed assets); Affiliate FE; Year FE	Affiliate: Ln (Sales); Debt/Total assets; Ownership percentage dummy and an interaction term with the tax incentive; Country: GDP growth; Domestic private credit/GDP

Notes:

a Databases information:

AMADEUS. Accounting consolidated and unconsolidated data on private and publicly owned European firms as well as on their ownership relationships.

ORBIS. Accounting consolidated and unconsolidated data on private and publicly owned worldwide firms as well as on their ownership relationships.

MiDi. Inward and outward German multinationals data on a set of balance sheet items (including yearly profit after taxes but before dividend distributions as a separate part of the equity of the firm), plus data on sales and employees and microdata on FDI.

BEA. Financial and operating data on U.S. multinational corporations.

Treasury Corporate Tax Files. Financial data on the 7,500 largest foreign corporations controlled by U.S. multinationals.

Compustat. Financial data on US MNEs.

b Results indicate the estimated coefficient of the effect of the tax incentive variable on reported profits multiplied by (-1). * denoting mean semi-elasticities summarized in Heckemeyer and Overesch (2013) and ** denoting results taken directly from the original studies. Particularly, results taken from Heckemeyer and Overesch (2013) refer to semi-elasticities when profit is used as the dependent variable. There is an exception regarding the study of McDonald (2008) because these authors only use earnings before interest and taxes as the measure of the dependent variable. Regarding the five study's results not taken from Heckemeyer and Overesch (2013), estimates are not always semi-elasticities and thus, they are not always comparable. Furthermore, the point estimates we reported for them belong to the specifications more similar to the one we adopt in this paper.

Source: Own elaboration.

Appendix 2: Some explanatory figures of the tax revenue results

Table A2.1. Evolution of the number of observations by parent company's country and year

GUO country -ISO code-	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AT	4	6	5	5	4	5	1	2	3	5
AU	2	2	1	1	1	1	2	3	2	3
BE	16	16	14	18	16	20	21	20	19	19
CA	12	13	13	13	13	15	12	14	13	10
CH	25	27	28	25	22	27	23	26	34	23
CL	2	2	2	2	2	1	2	2	2	1
CY	2	2	2	1	2	2	1	2	3	1
CZ	0	0	0	0	0	0	1	0	1	0
DE	70	74	77	69	64	81	81	76	83	71
DK	14	15	15	18	17	18	21	22	23	16
FI	8	8	8	7	7	8	7	7	7	6
FR	46	55	54	48	51	60	61	70	63	50
GB	55	56	56	57	57	66	64	68	62	50
GR	0	0	0	0	0	0	1	1	0	2
IE	9	12	12	10	10	10	9	13	7	8
IL	1	1	2	2	3	3	3	5	4	3
IS	1	1	0	0	0	0	0	0	1	0
IT	32	34	34	31	31	40	35	32	36	34
JP	55	59	60	59	54	65	65	56	65	33
KR	1	3	4	3	6	4	3	5	6	6
LU	64	66	69	59	66	77	75	67	76	76
MT	1	2	3	1	2	4	3	4	4	3
MX	3	4	1	3	4	5	5	3	7	5
NL	44	41	42	42	36	51	47	48	51	42
NO	3	5	5	5	2	5	5	4	5	5
NZ	1	1	1	1	1	1	1	1	1	1
PL	1	2	1	1	2	3	2	2	2	1
PT	6	6	6	7	7	7	8	8	7	5
SE	9	10	10	10	9	12	11	11	11	12
SI	0	1	1	1	0	1	1	1	1	1
SK	1	1	0	1	0	1	1	1	1	1
TR	1	2	2	2	1	2	2	0	0	0
US	172	185	189	189	191	214	214	213	208	147

Table A2.2. Difference in profits by parent company's country and year
(% of total difference in profits)

GUO country-ISO code-	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AT	1.11	8.13	2.76	1.74	0.20	0.31	0.15	18.23	2.30	0.15
AU	0.21	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BE	1.20	0.34	-2.57	-2.42	-1.05	-2.33	-4.29	-5.12	-22.24	-0.50
CA	-0.75	-0.54	-9.70	-2.95	-2.88	-1.41	4.55	19.31	70.93	1.85
CH	112.37	37.96	197.69	83.21	30.43	24.90	30.25	48.68	317.58	3.35
CL	0.43	0.22	1.49	0.22	0.10	0.00	0.23	0.36	2.02	0.04
CY	2.66	1.17	4.86	0.94	2.58	1.83	1.52	1.31	56.55	0.02
CZ	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	3.16	0.00
DE	-44.71	-11.53	-99.43	3.09	2.51	5.80	10.78	11.65	35.71	1.02
DK	2.16	1.55	27.10	7.30	6.32	8.21	3.67	6.73	28.16	0.56
FI	6.80	1.70	7.44	1.82	1.11	0.73	0.99	0.65	5.30	0.33
FR	9.82	6.84	-28.73	-48.49	-19.35	-68.89	-30.39	-63.39	-297.81	-6.58
GB	61.08	58.17	217.00	0.00	43.44	39.78	65.23	216.80	311.05	106.98
GR	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.16	0.00	0.01
IE	46.19	20.01	91.21	20.67	17.96	33.14	42.10	112.69	158.04	5.06
IL	0.11	0.01	0.64	3.87	1.26	1.41	8.80	8.60	0.25	0.01
IS	0.15	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
IT	-6.11	-0.72	-11.88	-1.65	-1.17	-2.92	-2.66	-3.94	-19.18	-0.56
JP	-28.33	-7.94	-84.94	-24.31	-18.83	-27.47	-35.26	-24.87	-134.42	-1.03
KR	0.06	0.32	1.80	0.08	1.59	3.55	5.77	12.78	26.19	0.39
LU	17.07	8.07	34.70	0.97	4.18	4.37	8.96	8.24	35.55	1.28
MT	0.00	0.00	-0.25	-0.01	-0.20	-0.32	-0.68	-0.61	-4.49	-0.07
MX	0.04	0.09	0.07	0.16	0.46	0.00	0.00	0.00	0.00	0.00
NL	18.04	6.78	45.14	13.61	5.35	17.56	26.70	26.27	197.49	2.13
NO	0.34	0.15	0.54	0.15	0.04	0.09	0.17	0.25	3.92	0.06

Table A2.2 continued

Table A2.2 continued

GUO country-ISO code-	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
NZ	0.05	0.02	-0.03	0.00	0.00	0.00	0.02	0.03	0.15	0.01
PL	0.25	0.56	1.34	0.55	0.92	0.47	0.26	0.39	1.97	0.05
PT	5.73	1.75	11.56	3.12	2.10	2.98	2.51	44.57	29.49	1.72
SE	14.76	3.28	12.14	0.77	1.40	1.12	4.45	3.40	37.46	1.58
SI	0.00	0.02	0.03	0.01	0.00	0.09	0.06	0.09	0.17	0.01
SK	0.27	0.02	0.00	0.04	0.00	0.05	0.33	0.26	0.25	0.00
TR	0.40	0.10	0.79	0.04	0.01	0.06	0.10	0.00	0.00	0.00
US	-121.40	-36.60	-320.79	-162.53	-178.48	-143.11	-244.40	-343.51	-945.67	-17.88

Note: This table shows for each year the percentage that a country's difference between actual and reported profits stands for on the sum of all countries' positive or negative difference. A negative (positive) sign indicates that for that residence country and year, actual profits in Spain were lower (higher) than reported profits and so, that PS was beneficial (harmful) for Spain.

Table A2.3. Spanish and Parent companies' country Corporate Income Tax Rates

Country -ISO code-	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AT	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
AU	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
BE	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
CA	0.36	0.36	0.36	0.34	0.33	0.31	0.28	0.26	0.26	0.27
CH	0.21	0.21	0.21	0.19	0.19	0.19	0.18	0.18	0.18	0.18
CL	0.17	0.17	0.17	0.17	0.17	0.17	0.20	0.19	0.20	0.20
CY	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.13	0.13
CZ	0.26	0.24	0.24	0.21	0.20	0.19	0.19	0.19	0.19	0.19
DE	0.38	0.38	0.38	0.30	0.29	0.29	0.29	0.29	0.30	0.30
DK	0.28	0.28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
EE	0.24	0.23	0.22	0.21	0.21	0.21	0.21	0.21	0.21	0.21
FI	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.25	0.20
FR	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
GB	0.30	0.30	0.30	0.30	0.28	0.28	0.26	0.24	0.23	0.21
GR	0.32	0.29	0.25	0.25	0.25	0.24	0.20	0.20	0.26	0.26
IE	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
IL	0.34	0.31	0.29	0.27	0.26	0.25	0.24	0.25	0.25	0.27
IS	0.18	0.18	0.18	0.15	0.15	0.18	0.20	0.20	0.20	0.20
IT	0.37	0.37	0.37	0.31	0.31	0.31	0.31	0.31	0.31	0.31
JP	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.38	0.38	0.36
KR	0.28	0.28	0.28	0.28	0.24	0.24	0.22	0.24	0.24	0.24
LU	0.30	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29
MT	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
MX	0.30	0.29	0.28	0.28	0.28	0.30	0.30	0.30	0.30	0.30
NL	0.32	0.30	0.26	0.26	0.26	0.26	0.25	0.25	0.25	0.25
NO	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.27
NZ	0.33	0.33	0.33	0.30	0.30	0.30	0.28	0.28	0.28	0.28
PL	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
PT	0.28	0.28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.23
SE	0.28	0.28	0.28	0.28	0.26	0.26	0.26	0.26	0.22	0.22
SI	0.25	0.25	0.23	0.22	0.21	0.20	0.20	0.18	0.17	0.17
SK	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.23	0.22
TR	0.30	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
US	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
MEAN	0.28	0.28	0.27	0.26	0.26	0.26	0.25	0.25	0.25	0.25
ES	0.35	0.35	0.33	0.30	0.30	0.30	0.30	0.30	0.30	0.30
ES-MEAN	0.07	0.07	0.06	0.04	0.04	0.04	0.05	0.05	0.05	0.05

Note: This table shows the highest marginal nominal CIT Rate, including local taxes. Information comes from KPMG (2006) and the KPMG website http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx.

Table A2.4. Reported profits by parent company's country and year
(% of total reported profits)

GUO country -ISO code-	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
AT	0.12	2.16	0.15	0.47	0.06	0.07	0.03	2.19	0.09	0.13
AU	0.05	0.03	0.00	0.01	0.02	0.04	0.03	0.13	0.16	0.04
BE	1.30	0.91	0.69	0.82	0.40	0.67	1.09	0.77	1.08	0.56
CA	0.74	1.30	1.08	1.15	1.47	1.63	2.30	2.90	3.45	2.33
CH	8.95	7.36	6.69	10.47	4.23	2.55	2.62	2.45	5.15	1.22
CL	0.03	0.03	0.04	0.02	0.01	0.00	0.02	0.02	0.04	0.02
CY	0.12	0.12	0.09	0.06	0.20	0.11	0.08	0.04	0.63	0.01
CZ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00
DE	14.73	9.18	6.82	8.56	6.87	11.34	17.31	13.47	15.43	10.66
DK	0.34	0.59	1.45	1.98	1.94	1.90	0.74	0.81	1.10	0.45
FI	0.82	0.50	0.46	0.62	0.42	0.21	0.25	0.07	0.19	0.15
FR	9.15	10.89	13.91	19.77	8.93	23.87	9.23	11.44	17.39	8.70
GB	13.33	30.92	34.87	16.56	33.36	22.95	16.50	21.72	8.64	52.32
GR	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01
IE	2.24	2.36	1.83	1.60	1.58	2.19	2.43	3.87	1.76	1.27
IL	0.12	0.01	0.07	1.75	0.48	0.32	1.48	1.03	0.01	0.02
IS	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IT	2.96	0.85	1.00	1.60	1.28	2.41	1.92	1.69	2.66	1.74
JP	5.43	3.71	4.17	3.09	2.71	2.96	3.34	1.87	3.26	0.81
KR	0.01	0.11	0.14	0.05	0.42	0.71	0.73	1.32	0.88	0.29
LU	4.03	3.99	4.86	3.57	4.55	3.58	7.56	4.13	8.86	7.24
MT	0.07	0.04	0.04	0.00	0.06	0.08	0.14	0.07	0.17	0.06
MX	0.01	0.04	0.01	0.11	0.35	0.22	0.17	0.13	0.44	0.16
NL	5.62	3.34	2.59	4.11	1.83	4.50	5.40	3.16	7.68	1.88
NO	0.05	0.06	0.05	0.10	0.03	0.05	0.08	0.07	0.38	0.08
NZ	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01
PL	0.02	0.09	0.04	0.07	0.13	0.05	0.02	0.02	0.03	0.02
PT	0.83	0.62	0.62	0.85	0.64	0.69	0.51	5.36	1.15	1.08
SE	2.30	1.25	1.08	0.52	0.58	0.35	1.22	0.55	0.91	0.87
SI	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
SK	0.02	0.00	0.00	0.01	0.00	0.01	0.03	0.01	0.01	0.00
TR	0.09	0.05	0.03	0.01	0.00	0.01	0.01	0.00	0.00	0.00
US	26.49	19.45	17.19	22.06	27.42	16.51	24.73	20.65	18.38	7.87

Appendix 3: Results for limited Spanish subsidiaries sample

lnL	0.63
	(9.99)***
lnK	0.04
	(1.47)
$T_{ES} - T_{EX}$	-2.94
	(-3.94)***
N	3,931
R^2	0.11
Subsidiary FE	Yes
Year dummies	Yes

Note: lnL is the logarithm of the cost of employees; lnK is the logarithm of the fixed assets; and $T_{ES} - T_{EX}$ is the difference between the Spanish tax rate and the tax rate of the foreign country where the parent company is situated. Subsidiary Fixed Effects and Year dummies are also included and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

Appendix 4: Additional analyses and robustness tests for the sample of EU subsidiaries

Table A4.1. Additional explanatory variables

	GDP pc growth; Inflation (2)	Crisis (3)	Crisis* $(T_{EU} - T_{ES})$ (4)	Sector* $(T_{EU} - T_{ES})$ (5)	Hight* $(T_{EU} - T_{ES})$ (6)	$(T_{EU} - T_{ES})^2$ (7)
LnL	0.55	0.54	0.54	0.53	0.54	0.54
	(7.32)***	(7.12)***	(7.10)***	(6.56)***	(7.11)***	(7.14)***
lnK	0	0	0	0	0	0
	(0.32)	(0.31)	(0.32)	(0.16)	(0.32)	(0.31)
ln(GDP pc)	-0.80	-0.65	-0.96	-0.38	-0.67	-0.69
	(-1.06)	(-0.86)	(-1.24)	(-0.46)	(-0.88)	(-0.91)
$T_{EU} - T_{ES}$	-3.09	-2.99	-2.61	-2.99	-1.96	-3.14
	(-2.06)**	(-1.98)**	(-1.66)*	(-1.96)**	(-0.90)	(-2.07)**
GDP pc growth	0.01					
	(0.67)					
Inflation	-0.04					
	(-1.53)					
Crisis		0.18	0.14			
		(1.88)*	(1.40)			
Crisis* $(T_{EU} - T_{ES})$			-1.03			
			(-0.97)			
Sector* $(T_{EU} - T_{ES})$				16.99		
				(1.47)		
Hight* $(T_{EU} - T_{ES})$					-2.73	
					(-0.90)	
$(T_{EU} - T_{ES})^2$						-2.46
						(-0.18)
N	1,648	1,648	1,648	1,474	1,648	1,648
R^2	0.09	0.09	0.09	0.10	0.09	0.09
Subsidiary FE	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: lnL is the logarithm of the cost of employees; lnK is the logarithm of the fixed assets; $T_{EU} - T_{ES}$ is the difference between the tax rate of the EU country where the subsidiary company is situated and the Spanish tax rate. Additionally, in column (2) the GDP pc growth and the inflation rate of the subsidiary company country, measured by the consumer prices index, are included. In columns (3) and (4) the crisis binary variable and this last variable plus the interaction term Crisis*$(T_{EU} - T_{ES})$ are respectively included. The interaction terms Sector*$(T_{EU} - T_{ES})$ and Hight*$(T_{EU} - T_{ES})$ are respectively added to the basic model in columns (5) and (6). Sector is a binary variable that identifies economic sectors of parent companies intensive in intangible assets; Hight is a binary variable that identifies situations in which the tax rate of the subsidiaries is higher than the tax rate of the respective parent company; in column (7) the quadratic term $(T_{EU} - T_{ES})^2$ is added. All specifications include Subsidiary Fixed Effects and Year dummies and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.

Table A4.2. Alternative indicators

	ALTERNATIVE INDICATORS				
	TOAS, STAF	TFAS, STAF	FIAS, EMPL	TOAS, EMPL	TFAS, EMPL
lnL	0.19	0.58	0.46	0.14	0.47
	(2.34)**	(7.64)***	(7.44)***	(2.30)**	(7.84)***
lnK	0.67	-0.02	0.05	0.77	0.02
	(9.44)***	(-0.96)	(1.62)	(12.24)***	(0.92)
$T_{EU} - T_{ES}$	-4.11	-2.88	-1.67	-2.75	-1.61
	(-2.77)***	(-1.93)*	(-1.13)	(-1.86)*	(-1.08)
ln(GDP pc)	-0.74	-0.81	-0.17	-0.91	-0.24
	(-1.04)	(-1.06)	(-0.24)	(-1.34)	(-0.34)
N	1,666	1,640	1,493	1,510	1,490
R^2	0.16	0.09	0.07	0.17	0.07
Subsidiary FE	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes

Note: lnL is the logarithm of the cost of employees or the logarithm of the number of employees, as indicated at the first row of the table; lnK is the logarithm of the fixed assets, the logarithm of total assets or the logarithm of tangible fixed assets, as indicated at the first row of the table; $T_{EU} - T_{ES}$ is the difference between the tax rate of the EU country where the subsidiary company is situated and the Spanish tax rate; and ln(GDP pc) is the logarithm of the GDP pc of the subsidiary company country. Subsidiary Fixed Effects and Year dummies are also included and estimations are Panel Corrected Standard Error (PCSE) estimations. ***, ** and * denoting statistical significance at the 1, 5 and 10 per cent levels, respectively.